

1. A method performed by a controller embedded in a device for retrieving data from a server, comprising:

sending a command to the server that identifies an instance of the device; and

5 receiving, from the server and in response to command, data that is specific to the instance of the device.

2. The method of claim 1, wherein the command includes an operational parameter for the device and the
10 data comprises an updated value for the operational parameter.

3. The method of claim 2, wherein the command includes plural operational parameters for the device and
15 the data comprises updated values that differ from current values of the operational parameters.

4. The method of claim 1, wherein the data comprises a list of operational parameters; and

20 the method further comprises:

sending a second command to the server, which includes operational parameters from the list; and

receiving, from the server and in response to second command, updated values of one or more of the operational parameters included in the second command.

5 5. The method of claim 1, wherein the data comprises a list of operations to be performed by the controller; and the method further comprises:
parsing the operations from the list; and
performing the operations from the list.

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6. The method of claim 1, wherein the data comprises a configuration file for the device.

15 7. The method of claim 1, wherein the command identifies the instance of the device by a device type and/or one or more of a serial number and a universal unique identifier.

20 8. The method of claim 1, wherein the embedded controller sends the command to the server periodically.

9. The method of claim 1, wherein the server runs the Hypertext Transfer Protocol and the command contains Extensible Markup Language Code.

5 10. A method performed by a server for sending data over a network to a controller embedded in a device, comprising:

receiving a command from the embedded controller;
identifying an instance of the device from information
10 in the command;
retrieving data that is specific to the instance of the device; and
sending the data to the embedded controller.

15 11. The method of claim 10, wherein:

the command includes a device type and/or one or more of a serial number and a universal unique identifier; and
the instance of the device is identified based on the device type and/or one or more of the serial number and the
20 universal unique identifier.

12. The method of claim 11, further comprising:
parsing the device type and one or more of the serial
number and universal unique identifier from the command
prior to identifying the instance of the device.

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13. The method of claim 10, wherein:
the command includes an operational parameter for the
device; and
the data comprises an updated value of the operational
parameter.

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14. The method of claim 10, wherein:
the data comprises a list of operational parameters
for the device; and

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the method further comprises:

receiving a second command from the embedded
controller, which includes an operational parameter
from the list of operational parameters;

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obtaining an updated value of the operational
parameter; and

sending the updated value of the operational
parameter to the embedded controller.

15. The method of claim 10, wherein the data comprises a list of operations to be performed by the device.

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16. The method of claim 10, wherein the data comprises a configuration file for the device.

17. The method of claim 10, further comprising:
10 receiving the data specific to the instance of the device; and
storing the data in memory;
wherein the data is retrieved from the memory.

15 18. The method of claim 17, wherein the data specific to the instance of the device is received via a Web page generated by the server.

19. The method of claim 10, wherein the server runs
20 the Hypertext Transfer Protocol and the command contains Extensible Markup Language Code.

20. A system comprising:

a controller embedded in a device, the controller
being capable of communicating over a computer network; and
a server that is capable of communicating over the
5 computer network;

wherein the embedded controller sends a command to the
server over the computer network that identifies an
instance of the device and, in response, the server (i)
identifies the instance of the device based on the command,
10 (ii) retrieves data that is specific to the instance of the
device, and (iii) sends the data to the embedded controller
over the computer network.

21. The system of claim 20, wherein the embedded
15 controller is not remotely-addressable from the computer
network.

22. The system of claim 20, wherein the computer
network comprises the Internet.

23. The system of claim 20, wherein the server runs
the Hypertext Transfer Protocol and the command contains

Extensible Markup Language Code.

24. A computer program stored on a computer-readable medium, the computer program being executable by a
5 controller embedded in a device to retrieve data from a server, the computer program comprising instructions that cause the embedded controller to:

send a command to the server that identifies an instance of the device; and

10 receive, from the server and in response to command, data that is specific to the instance of the device.

25. The computer program of claim 24, wherein the command includes an operational parameter for the device
15 and the data comprises an updated value for the operational parameter.

26. The computer program of claim 25, wherein the command includes plural operational parameters for the
20 device and the data comprises updated values that differ from current values of the operational parameters.

27. The computer program of claim 24, wherein the data comprises a list of operational parameters; and the computer program further comprises instructions that cause the embedded controller to:

5 send a second command to the server, which includes operational parameters from the list; and

receive, from the server and in response to second command, updated values of one or more of the operational parameters included in the second command.

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28. The computer program of claim 24, wherein the data comprises a list of operations to be performed by the controller; and

15 the computer program further comprises instructions that cause the embedded controller to:

parse the operations from the list; and
perform the operations from the list.

29. The computer program of claim 24, wherein the
20 data comprises a configuration file for the device.

30. The computer program of claim 24, wherein the command identifies the instance of the device by a device type and/or one or more of a serial number and a universal unique identifier.

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31. The computer program of claim 24, wherein the embedded controller sends the command to the server periodically.

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32. The computer program of claim 24, wherein the server runs the Hypertext Transfer Protocol and the command contains Extensible Markup Language Code.

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33. A computer program stored on a computer-readable medium that is executable by a server to send data over a network to a controller embedded in a device, the computer program comprising instructions that cause the server to:

receive a command from the embedded controller;

identify an instance of the device from information in

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the command;

retrieve data that is specific to the instance of the device; and

send the data to the embedded controller.

34. The computer program of claim 33, wherein:

the command includes a device type and/or one or more
5 of a serial number and a universal unique identifier; and
the instance of the device is identified based on the
device type and/or one or more of the serial number and the
universal unique identifier.

10 35. The computer program of claim 34, further
comprising instructions that cause the server to:

parse the device type and one or more of the serial
number and universal unique identifier from the command
prior to identifying the instance of the device.

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36. The computer program of claim 33, wherein:

the command includes an operational parameter for the
device; and

the data comprises an updated value of the operational
20 parameter.

37. The computer program of claim 33, wherein:
the data comprises a list of operational parameters
for the device; and

the computer program further comprises instructions
5 that cause the server to:

receive a second command from the embedded
controller, which includes an operational parameter
from the list of operational parameters;

obtain an updated value of the operational
10 parameter; and

send the updated value of the operational
parameter to the embedded controller.

38. The computer program of claim 33, wherein the
15 data comprises a list of operations to be performed by the
device.

39. The computer program of claim 33, wherein the
data comprises a configuration file for the device.

40. The computer program of claim 33, further
comprising instructions that cause the server to:

receive the data specific to the instance of the device; and

store the data in memory;

wherein the data is retrieved from the memory.

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41. The computer program of claim 40, wherein the data specific to the instance of the device is received via a Web page generated by the server.

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42. The computer program of claim 33, wherein the server runs the Hypertext Transfer Protocol and the command contains Extensible Markup Language Code.

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43. An apparatus for retrieving data from a server, comprising:

a memory which stores executable instructions; and

a controller which executes the instructions to:

send a command to the server that identifies an instance of the device; and

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receive, from the server and in response to command, data that is specific to the instance of the device.

44. The apparatus of claim 43, wherein the command includes an operational parameter for the device and the data comprises an updated value for the operational
5 parameter.

45. The apparatus of claim 44, wherein the command includes plural operational parameters for the device and the data comprises updated values that differ from current
10 values of the operational parameters.

46. The apparatus of claim 43, wherein the data comprises a list of operational parameters; and
the apparatus executes instructions to:
15 send a second command to the server, which includes operational parameters from the list; and
 receive, from the server and in response to second command, updated values of one or more of the operational parameters included in the second command.

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47. The apparatus of claim 43, wherein the data comprises a list of operations to be performed by the

controller; and

the apparatus executes instructions to:

parse the operations from the list; and

perform the operations from the list.

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48. The apparatus of claim 43, wherein the data comprises a configuration file for the device.

49. The apparatus of claim 43, wherein the command
10 identifies the instance of the device by a device type
and/or one or more of a serial number and a universal
unique identifier.

50. The apparatus of claim 43, wherein the embedded
15 controller sends the command to the server periodically.

51. The apparatus of claim 43, wherein the server runs the Hypertext Transfer Protocol and the command contains Extensible Markup Language Code.

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52. An apparatus for sending data over a network to a controller embedded in a device, comprising:

a memory which stores executable instructions; and
a controller which executes the instructions to:

receive a command from the embedded controller;

identify an instance of the device from

5 information in the command;

retrieve data that is specific to the instance of
the device; and

send the data to the embedded controller.

10 53. The apparatus of claim 52, wherein:

the command includes a device type and/or one or more
of a serial number and a universal unique identifier; and

the instance of the device is identified based on the
device type and/or one or more of the serial number and the
15 universal unique identifier.

54. The apparatus of claim 53, wherein the apparatus
executes instructions to:

parse the device type and one or more of the serial
20 number and universal unique identifier from the command
prior to identifying the instance of the device.

55. The apparatus of claim 52, wherein:
the command includes an operational parameter for the
device; and
the data comprises an updated value of the operational
5 parameter.

56. The apparatus of claim 52, wherein:
the data comprises a list of operational parameters
for the device; and
10 the apparatus executes instructions to:
receive a second command from the embedded
controller, which includes an operational parameter
from the list of operational parameters;
obtain an updated value of the operational
15 parameter; and
send the updated value of the operational
parameter to the embedded controller.

57. The apparatus of claim 52, wherein the data
20 comprises a list of operations to be performed by the
device.

58. The apparatus of claim 52 wherein the data comprises a configuration file for the device.

59. The apparatus of claim 52, wherein:

5 the apparatus executes instructions to:

receive the data specific to the instance of the device; and

store the data in memory; and

the data is retrieved from the memory.

10 60. The apparatus of claim 59, wherein the data specific to the instance of the device is received via a Web page generated by the server.

15 61. The apparatus of claim 52, wherein the apparatus runs the Hypertext Transfer Protocol and the command contains Extensible Markup Language Code.

Appendix A

GET COMMAND

5 GET /Widget/config.xml HTTP/1.1
HOST: www.acme.com
Content-Type: text/xml
Content-length: nnn

10 <?xml version="1.0"?>
<root xmlns="urn:schemas-upnp-org:device-1-0">
 <specVersion>
 <major>1</major>
 <minor>0</minor>
 </specVersion>
15 <device>
 <deviceType>urn:www-acme-
com:device:Widget:3</deviceType>
 <friendlyName>Widget</friendlyName>
 <manufacturer>Acme Industries</manufacturer>
20 <modelName>Widget</modelName>
 <modelName>Widget</modelName>
 <serialNumber>53266D</serialNumber>
 <UDN>uuid:4A89EA70-73B4-11d4-80DF-0050DAB7BAC5</UDN>
 </device>
25 </root>

Appendix B

POST COMMAND

POST /CONTROL HTTP/1.1

5 Host: www.acme.com
Content-Type: text/xml
Content-length: nnn

<?xml version="1.0"?>

10 <root xmlns="urn:schemas-upnp-org:device-1-0">

<specVersion>

<major>1</major>

<minor>0</minor>

</specVersion>

15 <device>

<deviceType>urn:www-acme-

com:device:Widget:3</deviceType>

<friendlyName>Widget</friendlyName>

<manufacturer>Acme Industries</manufacturer>

20 <modelName>Widget</modelName>

<modelName>3</modelName>

<serialNumber>53266D</serialNumber>

<UDN>uuid:4A89EA70-73B4-11d4-80DF-0050DAB7BAC5</UDN>

</device>

25 </root>

<parameters>

<Airflow xsd:type="integer">378</Airflow>

<Humidity xsd:type="double">46.7</Humidity>

<Motor xsd:type="integer">1500</Motor>

30 <Vent xsd:type="integer">4</Vent>

</parameters>

And the response containing parameters that have been
modified:

35 HTTP/1.1 200 OK

Connection: close

Content-Type: text/xml

Content-length: nnn

Date: Fri, 13 Jun 2000 13:43:05 GMT

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